

Special Issue Classroom Activities for Teaching Networks

Resource allocation as a networked process: An experiential social network analysis game

Research Article

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Abstract: This teaching note presents an experiential classroom activity that introduces resource allocation as a networked process rather than a linear mechanism. Students assume roles within a simulated ecosystem and negotiate resources under constraints of legitimacy, mission alignment, and institutional rules. Their interactions generate a relational dataset for analysis using standard social network measures. The activity is adaptable across undergraduate and graduate courses and demonstrates how inequality emerges through cumulative advantage, brokerage, and path dependence. It also highlights how context and institutional constraints shape outcomes and why qualitative interpretation is essential for understanding how and why network ties form.

Keywords: *Brokerage • Cultural policy • Experiential learning • Inequality • Social network analysis*

1. Introduction

Social network analysis is increasingly used to study production, policy, and inequality, yet students often encounter networks as abstract rather than lived structures. Policy courses, meanwhile, frequently present funding systems as procedural or normative without an opportunity for students to experience the relational dynamics through which resources actually flow.

This activity bridges these gaps by embedding students within a simulated cultural funding network that produces analyzable data through interaction. Designed for teaching contexts, the exercise foregrounds core network mechanisms, such as centrality, brokerage, clustering (Freeman, 1979; Granovetter, 1973) while demonstrating how network data are generated. By combining experiential learning with formal social network analysis, the activity enables students to connect lived interaction to network structure, emphasizing learning through structured experience and reflection (Kolb, 1984).

2. Goals

The activity demonstrates how funding outcomes emerge from network structures rather than neutral evaluation

processes. Students begin in unequal positions and engage in repeated interactions, allowing relational advantages to compound over time. Through this process, they observe how legitimacy and perceived demand condition access to resources without fully determining outcomes. Key mechanisms introduced include centrality, brokerage, clustering, cumulative advantage, and path dependence. The activity also emphasizes that network metrics must be interpreted in relation to the qualitative conditions that produce them.

Originally designed for a graduate cultural policy course, the exercise can be adapted for advanced undergraduate or early graduate settings and requires no prior training in social network analysis. In introductory courses, students may focus on interpretation, while in more advanced settings they can participate in data construction and analysis.

3. Setup

The activity is designed for 20–40 students and requires approximately 80–120 min. Participants are assigned one of four roles: small arts organizations, established arts organizations, politicians, and private funders. Each role has distinct resource endowments, legitimacy requirements, and constraints on interaction. Participants receive

resource cards (Xs) and legitimacy cards (Os). Xs represent material resources required for survival; Os represent public legitimacy, defined here as perceived relevance, visibility, or audience support that enables access to funding. Each organization must accumulate three Xs to survive the simulated year. Access to Xs depends on legitimacy and mission alignment, as detailed in the role descriptions below.

The activity requires printed role sheets, X and O cards, and a shared digital interaction log accessible via a URL or QR code. The log must allow responses to be exported in tabular format for analysis, as these data form the basis of the network. Students should have access to a personal device (phone or laptop) to record interactions in real time. The exercise is also best conducted in an open space that allows movement, though the exercise can be adapted to more constrained classrooms through seated or rotation-based interaction.

At minimum, the interaction log must record directed interactions between participants. Directionality distinguishes between resource-seeking and allocation behavior and enables analysis using measures such as in-degree, out-degree, and betweenness centrality (Freeman 1979). In addition to sender and receiver, the log should capture interaction type and outcome.

Game overview (quick start guide for instructors)

Game duration: ~80–120 min total

Participants: 20–40 students

Objective: Organizations must reach 3 Xs to survive; other roles must avoid loss conditions.

Game flow:

1. Role assignment, instructor + mission writing, students (10–20 min)
2. Rules + logging instructions, instructor (10–15 min)
3. Open negotiation period, students (30–40 min)
4. Game stop (instructor ends round; no more ties)
5. Data aggregation + debrief, instructor and students (20–40 min)

Stopping rule: Fixed time, not when actors succeed.

Win/Loss conditions by role:

- Organizations: reach 3 Xs
- Politicians: avoid funding failures and support at least two successful organizations
- Private funders: no formal loss condition; evaluated analytically (influence, brokerage)

Core constraints:

- Legitimacy thresholds (Os required before funding access)
- Mission alignment required for X transfers
- Xs are scarce and directional
- All interactions must be logged

Recording unsuccessful interactions is essential, as they reveal constraints that would otherwise be invisible. Optional fields, such as reasons for success or failure or third-party facilitation, can support more advanced analysis but are not required.

4. Interaction logging protocol

Each interaction is logged once by the initiating actor. Logging should occur immediately after the interaction for increased accuracy. Each logged interaction must include the following required fields:

Sender ID (initiating actor)

Receiver ID (target actor)

Interaction type (e.g., request, allocation, rejection, or exchange of X or O cards)

Outcome (successful or unsuccessful)

These fields are sufficient to construct a directed network and distinguish between different forms of relational activity. In practice, instructors can implement the log using a shared digital form (e.g., Google Forms) accessed via a QR code or link. A reusable template is provided in the supplementary materials. Students should keep the form open on their device throughout the game to enable rapid, real-time logging.

5. Role assignments

5.1 Small arts and culture organizations (~35–40% of participants)

These participants represent resource-constrained organizations with no initial Xs. Before seeking funding, they must secure two Os from others as legitimacy indicators. While legitimacy enables access to funding, it does not guarantee it. They may only receive Xs from actors with overlapping mission statements. Mission alignment is flexible: students may revise their statements to enable cooperation. If two organizations merge, they lose autonomy and must adopt a shared mission limited to overlapping priorities.

6. Established/large art-culture organizations (~30% of participants)

Established organizations begin with one X. To seek additional resources, they must secure one O. Their lower

legitimacy threshold reflects accumulated advantage from their establishment in the field. If they share or transfer an X, they cease to exist independently and must revise their mission accordingly (overlapping priorities only).

7. Politicians (~20–25% of participants)

Politicians begin with two Xs and may allocate no more than one X per organization. They lose the game if they fund organizations that fail to survive or if they fail to support at least two successful organizations. They may also act as brokers by connecting organizations, facilitating collaboration, and reducing risk.

8. Private funders (~5–10% of participants)

Private funders begin with three Xs and are not required to distribute them. They may only support organizations that both align with their mission and possess at least three Os. During the game, they may choose to participate actively or remain peripheral. Their role generates structural holes and brokerage opportunities.

9. Procedure

The activity proceeds in five stages and is facilitated by the instructor in real time (Figure 1).

First, students are assigned roles and asked to write a brief two- to three-sentence mission statement identifying their organization type, target audience, and core goals. For example: “A contemporary art space focused on emerging digital artists, engaging young urban audiences through experimental exhibitions.” Politicians and private funders must also write a mission statement outlining which forms of cultural activity, values, and audiences

they consider most worthy of support; for example, “I prioritize funding community-based arts initiatives that promote accessibility and education, with a focus on youth and underserved local audiences.” During game play, individual mission statements function as qualitative constraints on tie formation and funding based on mission alignment between actors, ~10–20 min.

Second, the instructor explains the rules, role-specific constraints, and the interaction logging system, ~10–20 min.

Third, students participate in a timed period of free-movement negotiation. During this stage, organizational actors seek legitimacy (Os) and resources (Xs) through partnerships. The instructor monitors time, answers procedural questions, and enforces rule compliance, but does not intervene in substantive decisions. At a given time, the instructor ends the activity: all negotiations cease, no further ties may be formed, and the interaction log is closed, ~30–40 min.

Fourth, the instructor (or advanced students) compiles the recorded interactions into a dataset that serves as the basis for subsequent network visualization and analysis with the class. This can be done in real time in the classroom, by the instructor separately, or as a student assignment. The resulting network can be analyzed through standard centrality measures, though not all metrics are equally interpretable in this context. Degree centrality provides a straightforward indicator of activity and visibility, particularly when in-degree is interpreted as demand for resources or legitimacy. Betweenness centrality is especially informative for identifying brokers. Eigenvector centrality can be used cautiously to illustrate how influence accrues through connections to already well-connected actors, especially in cases where private funders concentrate ties among organizations that are highly visible (represented through attaining O cards), ~10–20 min in class or assignment for next class.

Fifth, game activity and resulting network analysis should be carefully reviewed and discussed with participants. The activity is intentionally designed to caution against over-interpretation of network metrics, making

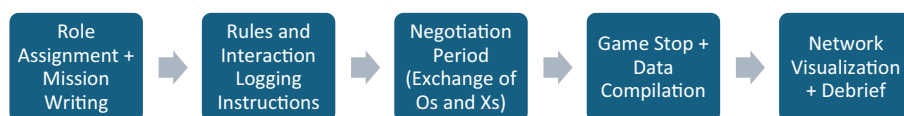


Figure 1. Flow of the resource allocation funding network game. Students move from role assignment and mission development to rule instruction and interaction logging, followed by a timed negotiation period in which legitimacy (O) and resource (X) exchanges occur under role-specific constraints. The instructor then halts interaction, compiles the logged data into a network dataset, and uses the resulting visualization to guide structured debrief and analysis. All interactions, including unsuccessful attempts, are recorded as directed ties.

Source: Author's contribution.

an in-depth debrief an essential component of the exercise. For example, high centrality should not be read as a proxy for organizational merit or effort; in many cases, it reflects early legitimacy or structural position rather than strategic superiority. Similarly, isolates or peripheral nodes do not necessarily indicate poor strategy, but may instead reflect institutional constraints such as legitimacy thresholds or mission incompatibility. These issues should be explicitly discussed with students in light of their lived experience during the game, ~20–40 min.

10. Debrief and teaching focus

The debrief links gameplay experience to network concepts and prevents overinterpretation of metrics. First, the instructor presents the network visualization generated from the interaction data. This may be a simple graph showing nodes and ties or a more developed visualization incorporating node size or color by role or centrality measure.

Second, students are asked to interpret the network based on their experience. Two initial questions are particularly effective: Who became central in the network, and why? Which actors struggled or remained peripheral, and why? These questions encourage students to connect structural outcomes to the constraints and decisions they encountered during gameplay, rather than attributing outcomes to individual ability or effort.

Third, the instructor introduces key concepts: degree centrality, as an indicator of activity and visibility within the network; betweenness centrality, as a measure of brokerage and intermediary position; and eigenvector centrality, to illustrate how influence can derive from connections to already well-connected actors. These measures should be explained in direct relation to the observed network and the roles students occupied, rather than as abstract definitions.

Finally, students connect these concepts to their experience, reflecting on how rules shaped outcomes. This step reinforces the core lesson of the activity: network structures are not neutral representations, but the cumulative result of institutional rules and strategic interaction under constraint. Instructors can guide this reflection with questions such as: Which rules most influenced who gained access to resources? How did legitimacy requirements shape who could participate in funding decisions? Where did you feel constrained in forming ties, and why? How might the network look different if one rule were changed? Instructors do not need to introduce the full range of centrality measures for the activity to be effective.

In introductory settings, focusing on the degree and betweenness centrality is sufficient to illustrate key dynamics without overwhelming students or requiring advanced technical background.

11. Variants and extensions

Several variants can be used to shift attention to specific network mechanisms or institutional dynamics without redesigning the game. They also provide a way to rerun the activity with the same cohort or adapt it to different course emphasis.

For example, legitimacy thresholds can be used to strengthen or weaken cumulative advantage. Increasing the number of Os required before organizations may seek funding produces stronger Matthew effects: organizations that secure early legitimacy become increasingly central, while others struggle to enter the network at all. Conversely, capping the total number of Os in circulation introduces artificial scarcity, intensifying competition for legitimacy and making visible how symbolic resources, not just material ones, structure inequality. These adjustments are particularly effective for demonstrating how small changes in institutional rules can amplify or dampen preferential attachment.

Other variants focus on information and access constraints. Instructors may introduce constrained mobility by limiting which actors are allowed to initiate interactions, thereby highlighting gatekeeping and barriers to access; for example, allowing only certain actors to broker connections, reflecting how intermediaries control access to resources and influence which actors gain visibility and support. Asymmetric information can be modeled by selectively revealing funding criteria, organizational success, or reputational standing to only some participants. These modifications shift attention to uncertainty and signaling effects, helping students understand why actors rely on reputation, intermediaries, and conservative strategies when information is incomplete.

Brokerage dynamics can be foregrounded by altering or removing specific roles. Eliminating private funders, for example, increases clustering around political actors and established organizations. This variant makes clear how certain actors can enable or constrain connectivity across the network. Alternatively, instructors can restrict politicians' ability to introduce organizations to one another, reducing opportunities for triadic closure and increasing funding risk. These role-based adjustments are useful for isolating how brokerage emerges from institutional position rather than individual initiative.

The activity is also well suited to exogenous shocks, introduced mid-game. A sudden funding cut, policy change, or reputational scandal can be announced after initial ties have formed, forcing actors to reassess alliances and reconfigure strategies. These shocks highlight which actors occupy structurally resilient positions and which depend heavily on a small number of actors. Analytically, such interventions make visible how networks respond to disruption and how path dependence can constrain adaptation even when actors recognize the need to change course.

Finally, the game can be repeated across two rounds with the same participants. Running the activity twice, either with identical rules or with modified parameters, allows instructors to introduce dynamic networks explicitly. Students can compare how early advantages compound, how reputations persist, and whether previously peripheral actors can reposition themselves. This extension is particularly effective in methods-oriented courses, where students can compare static and longitudinal network measures.

Such variants demonstrate the robustness of the activity as a teaching tool. The game serves as a flexible framework in which institutional parameters shape relational structures in predictable yet contingent ways.

12. Lessons

The activity uses simple rules to generate observable network mechanisms. The game produces a directed interaction network in which tie formation is constrained by legitimacy thresholds and mission-based compatibility. This design enables instructors to explicitly connect specific game rules to canonical mechanisms in social network theory as well as the field of funding and policy.

For example, legitimacy thresholds approximate preferential attachment: requiring organizations to acquire Os before seeking Xs introduces a staged process in which early legitimacy is necessary for later resource acquisition, but not sufficient. Analytically, this creates a recognizable pathway: actors with early legitimacy become more attractive partners, accumulate more interactions, and gain additional opportunities to form ties. The resulting pattern is consistent with preferential attachment, even though students are never instructed to seek out already-central actors – demonstrating how unequal centrality can emerge endogenously from institutional rules and strategic uncertainty rather than from differential effort or ability (Barabási & Albert, 1999).

Mission alignment produces homophily, showing how qualitative constraints shape networks beyond what quantitative data can capture. The mission alignment rule compels students to form ties primarily with actors whose stated goals overlap with their own, producing assortative mixing. Unlike categorical forms of homophily (e.g., shared demographic traits), mission alignment is textual, negotiated, and strategically adaptable. This distinction matters because it exposes a core limitation of purely quantitative network analysis: while the graph can show which ties exist, it cannot explain why certain ties were impossible, politically costly, or strategically avoided. Students often discover they can reframe mission language to enable cooperation, mirroring real organizational behavior. As a result, mission alignment provides a concrete illustration of how qualitative constraints shape network structure and why mixed-method interpretation is often necessary.

Political actors generate brokerage, often appearing as high-betweenness nodes (Granovetter, 1973). The politician role combines discretion over scarce resources with penalties for supporting unsuccessful organizations, encouraging risk-management strategies that rely on brokerage. Politicians may reduce uncertainty by funding organizations embedded in supportive clusters or by actively introducing organizations to one another, making survival less dependent on a single tie. When such introductions occur, they increase the likelihood of closed triads, stabilizing resource flows and reducing reputational risk. In the resulting networks, this frequently appears as high betweenness centrality for political actors and increased clustering around political nodes, linking students' intuitive understanding of political discretion to formal network concepts of brokerage, constraint, and closure.

Private funders illustrate how influence can emerge through connections to already central actors. By restricting private funders to supporting organizations that already hold high legitimacy, the game models a common philanthropic pattern in which resources flow toward already-visible actors. Network-theoretically, this can amplify inequality while increasing funders' influence. By selectively backing visible organizations across different parts of the network, private funders may create bridging ties that span otherwise disconnected clusters. Because these ties attach to already well-connected nodes, funders can increase their eigenvector centrality even with relatively few direct connections. This often provides a clear “aha” moment: influence in networks derives not only from the number of ties but from their structural placement.

Finally, mergers increase density but reduce autonomy and brokerage, demonstrating trade-offs between stability and diversity. When organizations combine resources, multiple nodes become one and many existing or potential ties are consolidated. Because density is defined as the ratio of realized ties to possible ties, this contraction typically increases density as the number of possible ties shrinks faster than the number of existing ties. However, this structural tightening comes with clear costs: fewer autonomous organizations remain, mission statements narrow to overlapping priorities, and opportunities for brokerage decline as bridging positions disappear. Substantively, this illustrates how consolidation may stabilize resource flows while reducing diversity and flexibility; analytically, it demonstrates how density increases can obscure losses in autonomy and intermediary capacity. In cultural policy terms, this consolidation produces denser fields with fewer innovative or distinct offerings, narrowing the range of programming available to audiences despite the appearance of structural “strength.”

Altogether, the activity consistently produces network structures that illustrate a variety of core concepts in social network analysis as well as funding pedagogy. The activity shows how network structure emerges from institutional rules and interaction, not individual merit alone (Borgatti et al., 2018). Students are able to trace macro-level structural outcomes like centralization, clustering, brokerage, and inequality, back to micro-level decision rules they experienced firsthand. The network is consequently not presented as an after-the-fact visualization, but as the cumulative product of institutional rules and strategic behavior enacted during the game.

13. Reflections

Students often see that unequal outcomes can emerge even when everyone is acting strategically. Those who fail typically describe their decisions as reasonable given the constraints, which opens a discussion of structural inequality and path dependence. When they compare their experience to the network visualization, they notice that central positions are usually held by actors who gained legitimacy early or align with funder priorities, and not necessarily those players with better strategies. Peripheral or isolated actors, in turn, tend to reflect limited access to legitimacy and brokerage rather

than poor decision-making. This activity is effective in part because it makes funding inequality observable rather than abstract. As the game progresses, students also come to see that funders are not neutral: each has their own priorities, forcing organizations to decide whether to treat their mission as fixed or adapt it to secure support.

Common failure modes reinforce these lessons. Organizations may hoard legitimacy cards, fragmenting the network with few organizations able to meet legitimacy thresholds for funding. Instructors should resist intervening too quickly. Os hoarding provides a useful entry point for discussing how symbolic resources function relationally and how excessive risk aversion can stall network formation altogether. If interaction stalls, instructors may briefly encourage exchanges by reminding students that Os have no value if unused or, in more severe cases, temporarily relaxing legitimacy thresholds to restart interaction.

Relatedly, political actors may delay decisions due to risk. This can temporarily suppress tie formation, but mirrors real-world policy paralysis under uncertainty. During debriefing, instructors can connect this behavior to network theories of risk, brokerage, and constraint, emphasizing how indecision itself becomes a structural force shaping outcomes. If this behavior significantly limits network formation, instructors can introduce time prompts to encourage action.

Disengagement by private funders is also common, particularly when students interpret their autonomy as permission to opt out. Such minimal participation can be framed as philanthropic absence or selectivity which affects funding and network cohesion. If disengagement significantly reduces overall connectivity, instructors may prompt funders by reminding them of their potential influence or by encouraging at least minimal participation to ensure sufficient network variation for analysis.

Finally, students tend to over-interpret centrality as merit. This misreading is pedagogically productive but requires careful correction. Instructors should emphasize central positions typically reflect early legitimacy, role position, or structural advantage. Likewise, peripheral positions reflect institutional constraints rather than poor decision-making. Clarifying this helps reinforce a central lesson of the activity: network metrics are valuable explanatory tools, but only when interpreted in relation to the institutional conditions and lived experiences that produced them.

Such pitfalls underscore the importance of structured debriefing. What appears to go “wrong” during gameplay often provides the clearest illustration of how networks generate inequality, uncertainty, and constraint.

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Conflict of interest statement

The author declares no competing interests.

Author contributions

The author confirms the sole responsibility for the conception of the study, presented results and manuscript preparation.

Data availability statement

Template materials necessary for this activity are available at OSF | Resource Allocation as a Networked Process: An Experiential Social Network Analysis Game.

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